Quadrupolar Order in Quantum Spin Ice NIC SHANNON, MATH-
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versity, OWEN BENTON, RIKEN, LUDOVIC JAUBERT, Okinawa Institute of
Science and Technology Graduate University — Quantum effects in spin ice can
modelled using an XXZ model on the pyrochlore lattice. For unfrustrated interac-
tions, $J_\pm > 0$, this model is accessible to quantum Monte Carlo simulations, and
supports a quantum spin liquid ground state for $0 < J_\pm \sim< 0.05 J_{zz}$. Here we
present a study of this model for frustrated interactions, $J_\pm < 0$, using a combi-
nation of classical Monte Carlo and semi-classical molecular-dynamics simulations.
We find that, for $J_\pm < -0.5 J_{zz}$, the spin liquid gives way with a phase with hidden
quadrupolar order.

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